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Radio Frequency Identification for Beef Cattle

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Individual identification of cattle can be accomplished using various techniques such as ear tags, freeze brands, or tattoos. One of the newer methods in the cattle industry is Radio Frequency Identification (RFID) ear tags.

Radio frequency identification is any electronic identification system comprising a transponder containing a micro-antenna that, when read at a specific radio frequency, emits a signal containing a unique electronic code.

The three common physical forms of RFID transponders are ear tags, injectable transponders, and rumen boluses. All of these RFID transponders contain an integrated circuit, antenna, and some form of protection for these parts. At present, ear tags are the method primarily used by livestock producers.

Tags

The present RFID tags used in the livestock industry are low-frequency tags that are read at a radio frequency of 134.2 kHz (kilohertz). In the beef industry, the tags contain a 15-digit alpha-numeric (numbers and letters) code called the Animal Identification Number (AIN). This 15-digit AIN is also printed on the outside of the tag. No additional information can be stored on an RFID tag.

Tag Reader

The tag reader (also called a scanner or an interrogator) is a data capture and identification device using a radio frequency electromagnetic field to stimulate and create a coordinated data response from a transponder. An interrogator can be fixed or mobile. These devices are commonly called readers or scanners. An example of a fixed reader would be a panel reader attached in an alley way. Mobile readers are often referred to as stick readers or handheld.

When purchasing a reader it is important to make sure that it is also ISO 11784/11785 compliant, so you are able to read any and all ISO tags.

The functions of readers are to transmit and receive radio frequency signals, contain a control unit to execute commands, incorporate an interface to transfer data, and receive and respond to commands from a host computer.

Characteristics of readers vary greatly. Some readers only store the data (15-digit AIN) and require that the information will be manually downloaded to a computer. Other readers are able to send data directly to a computer or palm pilot. Keep in mind that some readers require a specific software program to download data.

The technology incorporated with readers and RFID tags is rapidly changing as the industry continues to create a better and more efficient working system.

When purchasing RFID ISO compliance readers you should be able to read any tags that are ISO compliant. Tag readers and tags do not need to be manufactured by the same company to work together—just as long as they are made to be ISO compliant.

What is ISO?

The RFID tags are manufactured to comply with the International Standards Organization (ISO) standards. Using these guidelines, tags manufactured by one company can be read by a reader produced by another company.

The two key ISO standards are ISO 11784 and ISO 11785. ISO 11784 represents the definition of the code for electronic animal identification. ISO 11785 describes the accepted protocol for transmission between the tag reader and the tags. When selecting your RFID tags be sure to check that the tags are ISO 11784/11785 compliant.

Full- or half-duplex?

There are full-duplex (FDX) and half-duplex (HDX) tags. An FDX tag starts transmitting its code (15-digit AIN) as soon as it has received sufficient energy from the tag reader. Full-duplex tags keep repeating the code during activation.

An HDX tag is equipped with a capacitor. Once the capacitor is charged by voltage, which develops over the antenna in the activation field, a signal begins and transmits its code. The HDX tags transmit signal one-way at a time. The transmission protocols for FDX and HDX tags are under ISO 11785.

Tag Retention

As with any ear tag, retention is key to effective individual animal identification. There have not been any independent evaluations of the retention rate of tags from various manufacturers.

However, the manufacturers' guidelines from the USDA suggest that not more than 1% of tags applied may be lost in the year following application or the expected life of the tag (lifetime of the animal).

National Animal Identification System

For an RFID tag to meet the requirements for the National Animal Identification System (NAIS), it must have the country code (840) and the U.S. shield imprinted on each tag. The code structure for each tag must follow ISO standards. Tags should be placed in the left ear of the animal.

Animals already tagged with an RFID tag with a manufacturer code that does not contain the country code 840 will be grandfathered in; however, these non-840 tags will be phased out.

According to a USDA NAIS document released on February 23, 2006, RFID is now considered supplemental information. Individuals wanting to use RFID tags and be part of the voluntary NAIS need to be sure that the tags are ISO-compliant, are encased in a visually tamper-evident ear

tag, and have the AIN imprinted on it. When purchasing RFID tags, producers should be sure that they are USDA approved tags. New information about the NAIS is released frequently. To obtain the latest information visit the NAIS website at:

<http://animalid.aphis.usda.gov/nais/index.shtml>

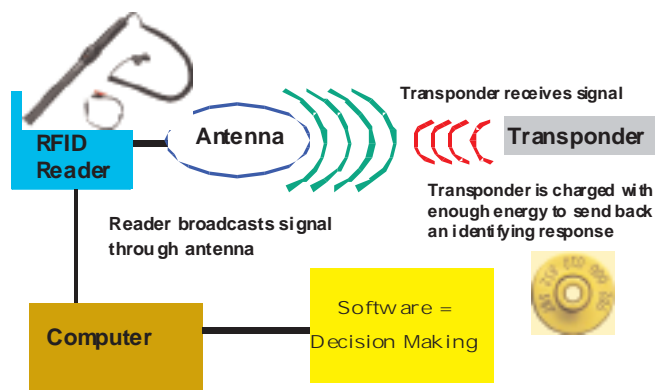
Within the AIN Management System the seller of AIN tags must keep records of who purchased the AIN tags (RFID and non-RFID). The seller can only distribute AIN tags to individuals/companies that have a premise identification number (PIN) or non-producer participant number (NPN).

Record keeping with RFID

The amount of records kept on each operation will be different depending on individual producers. RFID tags allow for a different method of keeping records. Remember that the RFID tags only transmit the 15-digit AIN and do not store any additional information, so record keeping still needs to be completed on paper or computer.

The two extremes of record keeping with RFID tags are 1) working on paper or 2) inputting data into a computer/palm pilot as animals are processed. What you decide to use should be based on your comfort level in combining your method with RFID. No system is right or wrong, but the key is keeping records that are important for your operation.

Components of an Electronic ID System



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